Claims

What is claimed is:

1. A method for successive linear approximation to obtain a specific point of a non-linear monotonic function, the method comprises the steps of:

a) obtaining a t-coordinate of the specific point;

b) selecting a minimum n-coordinate and a maximum n-coordinate to bound an n-coordinate of the specific point;

c) obtaining a minimum t-coordinate based on the minimum n-coordinate;

d) obtaining a maximum t-coordinate based on the maximum n-coordinate;

e) deriving a linear reference between the minimum n and t coordinates and the maximum n and t coordinates;

f) obtaining a reference n-coordinate lying on the linear reference based on the t-coordinate;

g) determining a reference t-coordinate lying on the non-linear monotonic function based on the reference n-coordinate;

h) determining whether the reference t-coordinate is substantially similar to the t-coordinate; and

i) when the reference t-coordinate is substantially similar to the t-coordinate, determining that the reference n-coordinate is substantially equal to the n-coordinate, wherein the t-coordinate and the n-coordinate define the specific point.

2. The method of claim 1 further comprises, when the reference t-coordinate is not substantially similar to the t-coordinate,

determining whether the reference t-coordinate is greater than the t-coordinate;

when the reference t-coordinate is greater than the t-coordinate, redefining the maximum t-coordinate to equal the reference t-coordinate to produce a first maximum t-coordinate;

determining a first maximum n-coordinate lying on the non-linear monotonic function based on the first maximum t-coordinate;

deriving a first linear reference between the minimum n and t coordinates and the first maximum n and t coordinates;

obtaining a first reference n-coordinate lying on the first linear reference based on the t-coordinate;

determining a first reference t-coordinate lying on the non-linear monotonic function based on the first reference n-coordinate;

determining whether the first reference t-coordinate is substantially similar to the t-coordinate; and

when the first reference t-coordinate is substantially similar to the t-coordinate, determining that the first reference n-coordinate is substantially equal to the n-coordinate.

3. The method of claim 1 further comprises, when the reference t-coordinate is not substantially similar to the t-coordinate,

determining whether the reference t-coordinate is less than the t-coordinate;

when the reference t-coordinate is less than the t-coordinate, redefining the minimum t-coordinate to equal the reference t-coordinate to produce a first minimum t-coordinate;

determining a first minimum n-coordinate lying on the non-linear monotonic function based on the first minimum t-coordinate;

a3

deriving a first linear reference between the first minimum n and t coordinates and the maximum n and t coordinates;

obtaining a first reference n-coordinate lying on the first linear reference based on the t-coordinate;

determining a first reference t-coordinate lying on the non-linear monotonic function based on the first reference n-coordinate;

determining whether the first reference t-coordinate is substantially similar to the t-coordinate; and

when the first reference t-coordinate is substantially similar to the t-coordinate, determining that the first reference n-coordinate is substantially equal to the n-coordinate.

4. The method of claim 1, wherein the t-coordinate comprises a time stamp value associated with a beginning of a video program stored in a video file and wherein the n-coordinate comprises a byte count value associated with the beginning of the video program.

5. The method of claim 4, wherein the video file comprises MPEG video data and MPEG audio data.

6. A method for successive linear approximation to obtain a specific point of a non-linear monotonic function, wherein the specific point is defined by a t-coordinate and an n-coordinate, the method comprises the steps of:

a) obtaining a t-coordinate of the specific point;

b) selecting a minimum point and a maximum point that bound the specific point, wherein the minimum point and the maximum point lie on the non-linear monotonic function;

c) deriving a linear reference between the minimum and the maximum points;

d) obtaining a reference n-coordinate lying on the linear reference based on the t-coordinate;

e) determining a reference t-coordinate lying on the non-linear monotonic function based on the reference n-coordinate;

f) determining whether the reference t-coordinate is substantially similar to the t-coordinate;

g) when the reference t-coordinate is not substantially similar to the t-coordinate, redefining the minimum point or the maximum point based on the reference t-coordinate;

h) repeating steps (b) through (g) until the reference t-coordinate is substantially similar to the t-coordinate; and

i) when the reference t-coordinate is substantially similar to the t-coordinate, determining that the reference n-coordinate is substantially equal to the n-coordinate, wherein the t-coordinate and the n-coordinate define the specific point.

7. The method of claim 6, wherein step (g) further comprises, when the reference t-coordinate is not substantially similar to the t-coordinate,

redefining the minimum point to correspond to the reference t-coordinate and the reference n-coordinate, when the reference t-coordinate is less than the t-coordinate.

8. The method of claim 6, wherein step (g) further comprises, when the reference t-coordinate is not substantially similar to the t-coordinate,

redefining the maximum point to correspond to the reference t-coordinate and the reference n-coordinate, when the reference t-coordinate is greater than the t-coordinate.

9. The method of claim 6, wherein the t-coordinate comprises a time stamp value associated with a beginning of a video program stored in a video file and wherein the n-coordinate comprises a byte count value associated with the beginning of the video program.

10. The method of claim 9, wherein the video file comprises MPEG video data and MPEG audio data.

11. An apparatus for successive linear approximation to obtain a specific point of a non-linear monotonic function, the apparatus comprises:

a processing module; and

memory operably coupled to the processing module, wherein the memory includes operational instructions that cause the processing module to: (a) obtain a t-coordinate of the specific point; (b) select a minimum n-coordinate and a maximum n-coordinate to bound an n-coordinate of the specific point; (c) obtain a minimum t-coordinate based on the minimum n-coordinate; (d) obtain a maximum t-coordinate based on the maximum n-coordinate; (e) derive a linear reference between the minimum n and t coordinates and the maximum n and t coordinates; (f) obtain a reference n-coordinate lying on the linear reference based on the t-coordinate; (g) determine a reference t-coordinate lying on the non-linear monotonic function based on the reference n-coordinate; (h) determine whether the reference t-coordinate is substantially similar to the t-coordinate; and (i) when the reference t-coordinate is substantially similar to the t-coordinate, determine that the reference n-coordinate is substantially equal to the n-coordinate, wherein the t-coordinate and the n-coordinate define the specific point.

12. The apparatus of claim 11, wherein the memory further comprises operational instructions that cause the processing module to, when the reference t-coordinate is not substantially similar to the t-coordinate,

determine whether the reference t-coordinate is greater than the t-coordinate;

when the reference t-coordinate is greater than the t-coordinate, redefine the maximum t-coordinate to equal the reference t-coordinate to produce a first maximum t-coordinate;

determine a first maximum n-coordinate lying on the non-linear monotonic function based on the first maximum t-coordinate;

derive a first linear reference between the minimum n and t coordinates and the first maximum n and t coordinates;

obtain a first reference n-coordinate lying on the first linear reference based on the t-coordinate;

a3

determine a first reference t-coordinate lying on the non-linear monotonic function based on the first reference n-coordinate;

determine whether the first reference t-coordinate is substantially similar to the t-coordinate; and

when the first reference t-coordinate is substantially similar to the t-coordinate, determine that the first reference n-coordinate is substantially equal to the n-coordinate.

13. The apparatus of claim 11, wherein the memory further comprises operational instructions that cause the processing module to, when the reference t-coordinate is not substantially similar to the t-coordinate,

determine whether the reference t-coordinate is less than the t-coordinate;

when the reference t-coordinate is less than the t-coordinate, redefine the minimum t-coordinate to equal the reference t-coordinate to produce a first minimum t-coordinate;

determine a first minimum n-coordinate lying on the non-linear monotonic function based on the first minimum t-coordinate;

derive a first linear reference between the first minimum n and t coordinates and the maximum n and t coordinates;

obtain a first reference n-coordinate lying on the first linear reference based on the t-coordinate;

determine a first reference t-coordinate lying on the non-linear monotonic function based on the first reference n-coordinate;

determine whether the first reference t-coordinate is substantially similar to the t-coordinate; and

when the first reference t-coordinate is substantially similar to the t-coordinate, determine that the first reference n-coordinate is substantially equal to the n-coordinate.

14. The apparatus of claim 11, wherein the t-coordinate comprises a time stamp value associated with a beginning of a video program stored in a video file and wherein the n-coordinate comprises a byte count value associated with the beginning of the video program.

15. The apparatus of claim 14, wherein the video file comprises MPEG video data and MPEG audio data.

16. An apparatus for successive linear approximation to obtain a specific point of a non-linear monotonic function, the apparatus comprises:

a processing module; and

memory operably coupled to the processing module, wherein the memory includes operational instructions that cause the processing module to: (a) obtain a t-coordinate of the specific point; (b) select a minimum point and a maximum point that bound the specific point, wherein the minimum point and the maximum point lie on the non-linear monotonic function; (c) derive a linear reference between the minimum and the maximum points; (d) obtain a reference n-coordinate lying on the linear reference based on the t-coordinate; (e) determine a reference t-coordinate lying on the non-linear monotonic function based on the reference n-coordinate; (f) determine whether the reference t-coordinate is substantially similar to the t-coordinate; (g) when the reference t-coordinate is not substantially similar to the t-coordinate, redefine the minimum point or the maximum point based on the reference t-coordinate; (h) repeat steps (b) through (g) until the reference t-coordinate is substantially similar to the t-coordinate; and (i) when the reference t-coordinate is substantially similar to the t-coordinate, determine that the reference n-coordinate is substantially equal to the n-coordinate, wherein the t-coordinate and the n-coordinate define the specific point.

17. The apparatus of claim 16, wherein the memory further comprises operational instructions that cause the processing module to, when the reference t-coordinate is not substantially similar to the t-coordinate,

redefine the minimum point to correspond to the reference t-coordinate and the reference n-coordinate, when the reference t-coordinate is less than the t-coordinate.

18. The apparatus of claim 16, wherein the memory further comprises operational instructions that cause the processing module to, when the reference t-coordinate is not substantially similar to the t-coordinate,

redefine the maximum point to correspond to the reference t-coordinate and the reference n-coordinate, when the reference t-coordinate is greater than the t-coordinate.

19. The apparatus of claim 16, wherein the t-coordinate comprises a time stamp value associated with a beginning of a video program stored in a video file and wherein the n-coordinate comprises a byte count value associated with the beginning of the video program.

20. The apparatus of claim 19, wherein the video file comprises MPEG video data and MPEG audio data.

a3

ADD a37